

**WHAT IS CLAIMED IS:**

1. An electrochemical cell comprising a cathode containing a proton-conducting compound as an electrode active material, an anode containing a proton-conducting compound as an electrode active material and an aqueous electrolytic solution containing a proton source as an electrolyte, wherein the electrolytic solution comprises a polymeric compound having an atom with an unpaired electron in its principal chain as an electron-transfer promoter.

2. The electrochemical cell as claimed in Claim 1 wherein the electron-transfer promoter is a polymeric compound which in the principal chain, has oxygen or nitrogen as an atom with an unpaired electron.

3. The electrochemical cell as claimed in Claim 1 wherein the electron-transfer promoter is a polymeric compound having an alkylene oxide moiety in a repeating unit.

4. The electrochemical cell as claimed in Claim 1 wherein the electron-transfer promoter is selected from the group consisting of polyethylene glycol, polyglycelol and polyethyleneimine.

5. The electrochemical cell as claimed in Claim 1 wherein the polymeric compound has an average molecular weight of 200 to 20,000.

6. The electrochemical cell as claimed in Claim 1 wherein a content of the polymeric compound is 0.01 to 30 wt% to the electrolytic solution.

7. The electrochemical cell as claimed in Claim 1, operable such that as a charge carrier, protons are exclusively involved in a redox reaction of the active materials associated with charge/discharge in both electrodes.